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Biology—Unapplied

ALFRED NOVAK
Morrill Branch of Lindbloom High School, Chicago

In the last decade, health teaching in the United States has infiltrated into courses in general science, biology, physical education, and even applied civics. Health classes are becoming an integral part of gym work and competitive athletics. Health-essay contests, health-poster contests, and healthful living contests are sponsored by schools and health-conscious communities. There is a pathetic lack, however, of the application of principles of health teaching by the schools themselves to the everyday living of the pupils. This may be due to a disinterested citizenry, the opposition of medical associations, or a lack of sufficient appropriations for the establishment of regular, thorough medical examinations and care.

In the public schools of the city of Chicago, an attempt is being made to watch over the health of the school child, but its fulfilment is carried out in an apparently half-hearted manner. Examinations of the eyes of elementary school pupils are made at irregular intervals and are not uniform in scope. Occasionally tests for hearing are given. Recently pupils have been tested for social diseases when parents consented. Any child who is absent from the elementary school for more than three days must be examined by the school physician before he or she is readmitted to school. These things look all right on paper but the examinations are neither accurate nor thorough. This examination for readmittance is purely routine—only a few of the school doctors have ever made real examinations before granting the card for readmission to classes. After the student reaches high school, he has no school medical care unless he goes out for athletics. Physical examinations of students are unknown in the ordinary Chicago public high schools, although there have been some attempts in that direction. In exceptional cases glasses are prescribed for pupils having defective eyesight upon recommendation by the teacher.

There are, however, high schools in the Chicago public school system known as special schools where children having

cardiac or orthopedic trouble benefit by an ideal medical setup. Heart cases get doses of cod liver oil, eggnogs and hot chocolate daily, plus frequent, medical, dental and eye examinations and any other medical attention their condition demands. Similar care is given those with orthopedic handicaps. Normal students must seek any medical attention they get at their own expense and initiative.

Morrill Branch of Linblom is one of these special high schools. Here all students are examined twice yearly by a dentist. The dentists are amazed at the small number of students requiring dental work (three out of a student body of 200 during 1941) and these were under the care of a dentist. The eyes of each student are examined regularly once a year and check-ups are made to see that prescriptions have been followed. In every case, glasses or eye treatment was secured within three weeks of the time the prescription was issued. A tuberculosis examination is made twice yearly by both the tuberculin test and the X-ray, whether the first test was positive or not. These students are given an annual whisper test and an audiometer test for hearing. The results are not merely recorded in neat filing cabinets but are also used in notifications to teachers so that they can seat the pupil according to his needs. In spite of the emphasis on health which such special medical care suggests, teachers judge that colds are as frequent among the pupils at Morrill as in any other school. With respect to colds, there is some doubt that the pupils have attained the degree of health consciousness the health program strives to bring about. Nevertheless, the results accomplished are certainly inspiring. It must be remembered, however, that Morrill is an ideal school for the fulfilment of health education projects. First, it is a small school; second, the students are conscious of health problems because of their own handicaps; third, it is a special school where the condition of health is a major problem.

The expenditure for this thorough medical attention is high, but not as high as might be expected. In this particular area, the Englewood Kiwanis Club, the Englewood Lions Club, the Infantile Paralysis Foundation, as well as other clubs and agencies, cooperate to make all this possible. Were you to step into one of the classrooms in this school, you would see, aside from a few pairs of crutches and an occasional wheelchair, an ordinary, busy classroom—but behind this appearance is a background of active application of health education. It would not be an easy task to institute this activity in all schools in the United States, but it is not impossible, impracticable, too costly, or unnecessary when the future health of the nation is at stake. Certainly, it would not be too great a financial burden to have each student in high school examined thoroughly each year. A staff of medical men could set up quarters every year in each school and check each pupil, giving the essential medical and dental examinations, following through with recommendations and checking to see that they have been followed. If this were not practicable, a system could be arranged whereby the pupils would be taken to the clinics at medical and dental centers. The medical and dental work need not be done there, but the presence of injuries, caries, infections, etc., would be detected in time to institute treatment before permanent harm has been done.

The opposition to this plan from indignant taxpayers and irate medical associations might be great, but it is time the people awoke and upset the

budgets to provide more extensive appropriations for better health. Unfortunately, the present drain on medical staffs would make any health plan in schools very difficult to attain until the war is over.

But is the health service offered the children a part of our program of teaching? What greater object lessons in health education could come from other means than application of medical practice on the pupils themselves? How better could they learn of body reactions to germs than through tuberculin tests? How well they will learn what blood pressure tests mean after having their own taken. Prevent them from learning the value of biaural hearing after a whisper test. Try to dull their interest in fluoroscopes after they have seen through themselves. Students are fascinated by a simple stethoscope, by a glance through the microscope, and even by a forehead mirror. But most students are denied these experiences. Adequate health care could be a part of our dynamic biology. It could be real health education. But is it?

(Most local dental and medical associations gladly cooperate with the schools in their health programs. To a considerable extent their services are gratuitous. It is not fair to them that we should demand that they bear the major part of the burden of health maintenance in the community.)

An Experiment in Posture Analysis

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Good posture is fundamentally the result of self-discipline. No external pressure can improve permanently the posture of any individual. Neither will good posture as maintained in military drill, in calisthenics, or in any other such activity be effective in daily life unless the body positions therein established are voluntarily made habitual by the person practicing them. The part of the teacher is to induce the students to desire good posture, to present to them as accurately as possible the defects in their posture, and then to show them exactly how they can correct those defects. The following experiment, carried out as a science club project at the Immaculata High School during the years 1938–39 and 1939–40 was an attempt to attain those three objectives.

The subjects of the experiment were three biology classes (about one hundred sophomore girls) taught by the author of this paper. We planned to make a statistical study of our results, but photographing the girls required much more time than we had allowed. Therefore analytical studies of the pictures were made in the laboratory, and the project then abandoned. I left the school in the autumn of 1940, and so have not been able to complete the work.

The first step in the project was to photograph each girl. The first year the girls were photographed against a plain background, which was afterward cut away. The second year a background of white wrapping paper ruled with black crayon into six-inch squares was used. The paper was tacked to the top of a press in the laboratory and rolled up when not in use. The position of the camera tripod was marked on the floor with thumb tacks, as was the spot where

the subject was to stand. Lights, film, lens opening and shutter speed were standardized, thus making the photography a matter of routine. Two girls were photographed on each frame, a roll of film sixteen pictures. Members of the science club (these girls were not members of the biology class) took and processed the pictures. The first year we took only profile pictures; the second year both profile and full face pictures were taken. The negatives were enlarged so that each figure when completed was about seven inches long. This fitted neatly upon an ordinary sheet of laboratory drawing paper. The girls were photographed in sneakers and play suits, and were told to remove girdles or other confining garments before the pictures were taken. After we had studied the pictures we found that the play suits were too bulky to give any advantage in studying the figure, except that they revealed the position of the knee. It is important to remove shoes and girdles, and a swimming suit would have been an advantage, but the ordinary school uniform would have served almost as well as the gymnasium suit. We learned also that the ruled background is much more useful than the plain, and that the front view shows nothing that is not shown better by the profile except the position of heads and feet. Every girl had one shoulder and one hip higher than the other.

The pictures were introduced into the biology laboratory at the time the class was studying bones and muscles. A model of the human body, with some muscles shown, was available, but no skeleton. We studied the muscles of the human back, noting the part they play in holding the body erect. We discussed the role of the spine, and of the pectoral and pelvic girdles. We studied the structure of the split thigh bone of a calf, and discussed the importance of proper diet in bone formation. We compared hand and foot, and discussed proper footwear. In each class were several girls wearing extremely high heels. Some of these walked up and down the aisles, first wearing their shoes, and then without them. The differences in standing position and in walk were often quite conspicuous, particularly when the girl was learning to wear high heels, as many of these fifteen-year-olds were. As a home exercise the girls had some one make a tracing of their shod and then of their unshod feet. When the outline of the foot was cut out and laid upon the drawing of the shoe the too-large and too-small shoes were revealed, sometimes much to the astonishment of their owners. I do not make a blanket condemnation of high-heeled shoes. Many girls can and do wear them comfortably. However, shoes with a heel base of one square inch or less do not offer adequate support, particularly when the young wearer must walk on slippery floors and stand in street cars and elevated trains. Cut-out shoes with no support for heel and instep are not practical for daily wear. During this period I deliberately tried to sell to the class the idea of good posture. We studied the illustrations in fashion magazines (particularly those illustrated with photographs) picked out good and bad postures, and analyzed them. Then the girls were ready for their own pictures.

The first year we cut out the pictures like paper dolls. There were then difficulties in determining the perpendicular to the base, and the next year we used the ruled background, which was much more desirable. A perpendicular line passing through the shoulder was then drawn. With a colored pencil arrows were drawn to the ear, shoulder, hip and ankle. The girls' long hair was a disadvantage. It should have been drawn up from the neck

and ears and fastened on top of the head. A notation was made if the perpendicular line did not pass through any one of the points mentioned, and attention was called to stooped shoulders, locked knees, and heads held too far forward. Other arrows were drawn to the shoulder blades, back of the neck, back, hips and abdomen, and each girl decided whether or not she had a dowager's hump, angel wings, kyphosis or lordosis curves, a fanny, or a protruding abdomen. The front view pictures showed heads carried on one side, pigeon toes and splay feet. After the analysis was made in class, the girls took the pictures home and wrote descriptions of themselves, discussing their good as well as their bad points. Another very practical and graphic method of calling attention to defects is to trace on cellophane the outline of a well poised human figure, and then to lay it over the picture.

After descriptions were written we practiced the correct positions. The girls stood with feet straight ahead and with relaxed knees. They straightened their spines against the door, and poised their heads with the aid of a bean bag. They pulled in their abdomens. They sat, rose and walked. For the time at least they were conscious of their postures, for there were those humiliating pictures, and the descriptions accusing them of all kinds of faults! One decidedly plump young lady, with a conspicuous "spare tire" about her waist, was so impressed by her appearance that she streamlined her doll to sylph-like proportions, and then based her criticisms upon this new and improved model.

Although no analysis of the results was attempted, I gained some striking impressions. In that group of one hundred, only one had strikingly fine carriage. Two were slightly crippled, and only three or four had extremely poor posture. One of these was the athletic champion of her class. Those who were of average weight, or better, had finer posture than the very thin. The incomplete development of adolescence eliminated the possibility of some defects. Humps on the back of the neck, protruding abdomens and conspicuous hips were rare. However, almost every girl carried her head too far forward. Many had flat chests, stooped shoulders and sharply protruding shoulder blades. There were some with locked knees, the whole body being swayed forward. There were many who just slumped.

In selecting the girls with the better posture, I tried to choose all types, and to emphasize the fact that poise is independent of build. I pointed out the importance of well-chosen shoes, and of clothes generally. A well-fitted foundation garment will do much to correct lines, but a girl must understand that such a correction depends upon the newness and firmness of the garment, and is in no way permanent. I was able to do very little in regard to correct walking, but a great deal can be done with a large mirror, or with shadows. The shadow as it falls on the ground before one should move along smoothly. If it jerks, there is something wrong with the walk. In most cases the body is not held firmly, but sways back and forth, or from side to side. Sometimes it is jerked up and down.

There has been no opportunity to test the effects of this experiment. Three or four of the girls who took the pictures are now college freshmen. They are posture conscious, and one of them was chosen one of the ten best poised women in her college.

I am very grateful to Miss Kathryn Fox, who took many of the pictures for this project, and has helped me to arrange the material for publication.

That the Blind May See

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How often have you, when describing a structure to students, taken a pencil or chalk and augmented your words with a sketch? But of what service is such a sketch to the students deprived of the sense of light, with all of its color and shade? Some substitute must be found for such illustrations when our blind come for college education in mass class work.

It was my privilege, as a graduate assistant in a freshman class in biology, to be assigned to a group which included a blind student (a girl). This young woman, deprived of sight at the age of eleven, could interpret gross forms such as trees, worms and birds (as she remembered these things) and she managed the course very well until we came to the intricacies of the cell. Here she was lost in the detail. As she took her notes in Braille and had the usual equipment, I conceived the idea of "drawing" for her by means of the depressions made by her stylus. Together we worked out a diagram of a typical cell and finally achieved a series of "drawings" illustrating the usual steps accented in a discussion of mitosis. She learned more rapidly than the average student and was soon "drawing" stages and phases, as they were suggested, and naming the structures as she placed them in proper relationship. We used this same method in studying the ameba, the paramecium, the hydra (in general form and in cross section), the gross anatomy, both external and internal of the earthworm and the frog, as well as some forms of the green algae and the higher plants. The student completed the course with satisfaction, but I had the feeling that the sense of the third dimension was a lost world to this student and longed for models in place of the flat "drawings."

A few years later, there came to my class in General Zoology a young woman deprived of her hearing. She had to make her own way and in the endeavor to help her find her niche, clay modeling was suggested. The student soon wearied of the usual subjects offered a beginner in this work and asked if she might use zoological subjects. Her first venture was cleavage and gastrulation in the starfish and when she brought us the clay studies to check, they were so well done that someone remarked, "Why! a blind person could understand these!" This gave our clay modeler the stimulus not only to complete the embryology of the starfish but to undertake a set of models illustrating mitosis. This she accomplished, not in the usual method where color and painted structures form such a large part, but with all the structures in relief and with different textures indicated so that the finger-tips of the blind may be aware of change. Even the astral rays and the spindle fibers are in relief. (This set shows a resting cell about five inches in diameter and the other stages in relative proportion.)

The following year a blind man entered class and with the aid of these models, life was a joy to three persons: the blind could understand, the deaf felt elation in that she had made a contribution and I had the satisfaction that the third dimension had been presented. The results were so satisfactory that a third project was undertaken. This time

a series of gametogenesis (male and female), fertilization, and first cleavage in *Ascaris* was selected. This series was checked in the clay and the studies presented to the blind young man for criticism. He pronounced them "illuminating" and we proceeded to make the models. Through the aid of this same young man, we made charts (the size of the Braille sheets) of frog circulation, using a separate sheet for arterial and venous systems. We used a stylus and made a double line of depressed dots in order to indicate the branching vessels. The young man checked the work until we had charts which could be followed easily and then he labeled the charts in Braille and varnished the raised side of the sheet. I was sorry to give up the sheets but he seemed so eager for them that I gladly gave them to him, never dreaming of the use he planned to make of them.

Fascinated by the aid her work had given, the deaf young woman now ventured to make a set of models to illustrate chick embryology as our wax models are far too fragile to be used in this type of teaching. The series starts with a life-sized egg in a sagittal section showing the first two lines of cleavage. The surface view is enlarged in the next figure using only a small area of the yolk and the blastodermal disc about two inches in diameter. The series includes several stages of the formation of the embryo carefully indicating concresence and the relationship of the embryo to the yolk, the general form and relative size of the twenty-four and thirty-six hour stages with neural groove and associated structures, and the forty-eight hour stage with body form and vitelline blood vessels. This last stage is made so that it may be lifted from the yolk and the structures on that side of the embryo observed. This series works splendidly and the blind seem to feel the forms developing under their finger-tips.

The following summer after the young man had been with us, he asked for references which might be put into Braille for a young woman who planned to take the course the following fall. I made an outline of the course and indicated text readings which might be used at points where the student might have need for repeated study. Imagine my surprise in the fall, to find that the young woman possessed almost a full text in Braille and also the charts which I had been so loath to give up. Together, this young woman and I, worked out charts for the digestive system, the respiratory and urogenital systems of the frog. These were labeled and varnished and placed with the other charts.

During the years, a student assistant made the department a dissectible model of the paramecium, showing the embedded micronucleus, expanded and contracted contractile vacuoles and the food vacuoles in normal path. and the unexploded trichocysts in the ectoplasm. Results indicate that this model is of service.

We possess a series of frog embryology purchased from a supply house and this helps us to demonstrate holoblastic unequal cleavage and the principles of internal development. We have reconstructed the models in some places to make changes more discernible, and now feel that we can illustrate simple embryology in fair shape.

Some years ago, a talented student started a series of heads (about six inches high) depicting prehistoric man. With the aid of pictures, he made Pithocanthropus and Neanderthal Man. Later another student modeled Heidelberg Man and the Cro-Magnon, and finished the series with a Nordic. These five heads make a demonstration for the

final lecture in the course, and while we have lantern slides for the general class, the blind feel a part of the class as they too "may see."

This last year we had a young woman in class possessed of the accumulated material in Braille and the "drawings" and she thoroughly enjoyed herself and we reaped the benefit of our years of experience.

With the present awareness of the biological supply houses to the needs of the blind, we may have no further need to make our own models unless it be from the standpoint of economy or adjustment for some other handicapped person, but we plan to continue with the charts, as rapidly as the blind have the opportunity to cooperate with us, as these seem to be of astonishing assistance in transmitting information.

OUR OPPORTUNITIES AND RESPONSIBILITIES

"The American people are the healthiest in the world, and the present generation is the healthiest in the nation's history." So spoke Surgeon-General Thomas Parran, M.D., of the United States Public Health Service, in January, 1940. And yet, during 1941 the examining physicians rejected approximately 30 per cent of our young men called by the Selective Service for defects the majority of which were preventable. What a terrible indictment on the health of the nation!

In this time of emergency, when both our liberty and our culture are in imminent jeopardy, it is imperative that our military and civilian populations be strong in body and steady in nerves. It is, therefore, essential that science, personal effort, and group effort all be concentrated on the improvement of the health habits of the nation.

Human advance lags more or less behind scientific discoveries. Much valuable time elapses before the majority of peoples realize sufficiently the advantages of these discoveries to cooperate in the practical applications of them. Nowhere, unfortunately, is this more evident than in the fields of medicine and hygiene. Correct procedures for the maintenance of health are known but those which would prove most effective are not being utilized because the general public does not recognize their value. It is vitally important that the proper health knowledge be brought to all of us. But bringing health knowledge directly to our adult population is very difficult and often impossible. However, it can be brought to parents indirectly through the medium of their children. Parents are inclined to give the children what they want. The child's influence upon the parent is therefore the best way we have to change the adult's opinion about any health procedure. Why has this direct avenue into the home been neglected so long?

The school, which has been and is the center of educational activities in the community, offers numerous opportunities of introducing better health practices into the home. The child accepts new ideas readily and is ever willing to cooperate with any enthusiastic leader who has gained his confidence. Formal health instruction, either isolated or correlated with other subjects; physical examinations; tuberculin testing; adjusted physical education programs; and sanitary surroundings impress the child and lead him to discuss them at home. Often the inspired pupil insists that his parents follow the procedures learned at school. And who is more capable of leading the children during the period when attitudes and habits are being formed than the skillful and sympathetic teacher?

We biology teachers, because of our superior knowledge of the body processes and the interrelations of living things, should be most effective in teaching health. We have been privileged to teach much of the formal health instruction in the high school. We realize that in many of our high schools the amount of health instruction now given is not sufficient to develop citizens with proper emotional balance, sensible health habits and a wholesome outlook on life. Why not give more consideration to the basic needs of your students and see to it that more and better health instruction is given in your school?

Brother H. Charles, F.S.C.
St. Mary's College,
Winona, Minnesota

PROTECT YOUR EQUIPMENT

In this period of critical shortages of many essential war materials one of the most important of the wartime duties of the science teacher is the conservation of scientific equipment. Many items will be impossible to replace until some time after the war is over. Most equipment now on hand can be made to last out the duration, if properly cared for. In this land of abundance we have become careless; we must now be careful or do without. It is often surprising to teachers and students alike to see what can be done with an old piece of apparatus which in other days would have been discarded without hesitation. The wise teacher will impress upon his students the importance of this type of conservation, and thus enlist their aid, both in added care and in actual repairing and substitution.

Metals and rubber are critical war materials; as teachers we should be specially concerned to see that they are not wasted by unnecessary neglect. Metal instruments should not be allowed to rust. They should be dried after each use and wiped with an oily cloth if they are to be left in storage for some time. Microscopes and other optical equipment should be kept as clean and free from dust as possible. Moving parts should be oiled and kept clean. No metal instruments or equipment should be stored in the same cases or cabinets with volatile chemicals or strong acids.

Rubber must be protected from heat and greasy substances. Stoppers, tubing, gaskets and other rubber items should be stored in a cool, dark, dry place, preferably in an airtight container.

Glass has not yet become a critical problem, but in view of the widespread substitution of glass for metals it behooves all science teachers to take special note of glassware also. A large part of the loss by breakage could be avoided with extra care.

Stored chemicals should be examined periodically to see that the stoppers or lids are tightly in place. Formaldehyde and alcohol may be used over several times. They may be strained through several thicknesses of cheesecloth or filtered through a coarse chemical filter to remove bits of tissue and other sediment. Alcohol may be reclaimed by distillation, with simple equipment. In many cases chemicals may be used more sparingly than has been our custom. Staining reagents and other solutions which deteriorate on standing may be made up in the minimum quantity necessary for the job at hand.

The American Biology Teacher welcomes specific suggestions along this line. Don't be bashful; you may have thought of some little trick-of-the-trade which will help many other teachers to save almost worn out equipment or dwindling chemicals.

SCIENCE CLUBS OF AMERICA

Science Clubs of America, the national organization of science groups in the nation's high schools, has begun a year of war service, with an accent upon preparing boys and girls with scientific ability for their most useful roles in war and peace.

This year any club in America's secondary schools, public, private or parochial, may affiliate with Science Clubs of America without payment of fees. Science clubs will be urged to devote their time and energies to giving their members the kind of experience that will help them engage in technical work for the armed forces, scientific research laboratories and industry, stressing especially the kinds of service in which manpower is now lacking. Many activities are planned, among them the Second Annual Science Talent Search for $11,000 in Westinghouse Science Scholarships, which will close this year at Christmas time. This nation-wide search is open to high school seniors.

Each science club has an adult sponsor who is usually a science teacher in the high school. Clubs may have as many members as desired, the usual number being about twenty. Upon affiliation with Science Clubs of America, the sponsor of the club receives assistance material, including information on how to organize and activate the club, suggestions on war services, lists of scientific education material that may be obtained free or at low cost, lists of recommended books, a book containing the essays of the First Science Talent Search, and other material.

The headquarters of Science Clubs of America is in the Science Service Building, 1719 N St., N.W., Washington, D. C., and information will be supplied on request.

THE NEW YORK MEETING

As has been customary in the past, the annual meeting of *The National Association of Biology Teachers* will be held in connection with the meetings of *The American Association for the Advancement of Science*, December 28, with headquarters at the Governor Clinton Hotel, 31st Street and 7th Avenue. President-elect Helen Trowbridge is the program chairman. Plans for the sessions are well under way and detailed information will be printed in the December issue of THE AMERICAN BIOLOGY TEACHER.

Community Organization for Health Education

C. E. TURNER, A.M., Sc.D., Dr.P.H.*
Massachusetts Institute of Technology

If you have been a biology teacher for a decade or more, you have seen certain trends which affect the health aspects of your teaching. Let me list some of these tendencies which seem real to me and see whether you agree that they are.

1. Problem solving is increasingly important in education.

2. Health authorities are recognizing education as an increasingly important factor in promoting the public health.

3. Leaders in education are asking for an extension of health teaching applied to effective living at the high school level. *Health in Schools*, the 1942 Yearbook of the American Association of School Administrators says: "Physiology or human biology is at present included in most high-school courses of study. Such a class can be broadened in scope and vitalized so that it includes a variety of human conservation problems, both personal and public, with physiology and anatomy serving as a background of explanation for some of these problems.

* Dr. Turner was the chairman of the recently disbanded Committee on Community Organization for Health Education of The American Public Health Association. Until the supply is exhausted a copy of the 120-page report of this committee may be secured by sending 9¢ in stamps with your name and address to The American Public Health Association, 1790 Broadway, New York City.

The emphasis should be shifted from bones and blood vessels to problems of living. Concepts of racial improvement, public health, and adequate, personal and social living are the sources of curriculum materials. Such a course is most profitable in the junior or senior year in high school. It should meet daily for at least one semester, preferably for two, and be recognized as on a par with other school offerings."

4. At many places over the country, school health education and adult health education are merging into a united and unified community-wide program of health education. It is this development which the writer would like to discuss with you more particularly.

You are already influencing the health of youth through your classes. Perhaps you have participated in the organization of your school to provide a broad, practical, and integrated health program in all activities and subjects of instruction. But have you, as a citizen and educator, considered the possibilities of closer relationships between the school system, the health department, and voluntary health and social agencies in the interest of a community-wide, health education program?

Perhaps a quotation from the American Public Health Association report will explain what we mean by a community-wide program. Although the committee report also includes examples of community organization for health education in cities, the following excerpt describes a rural school situation:

"A typical example of a school-initiated program which led to community organization for health education is to be found in Bulloch County, Georgia, an agricultural, five-crop county of 669 square miles and a population of 26,500, including 10,000 negroes. Underlying this program is a zone plan for rural school supervision, initiated by Dr. M. S. Pittman, president of the Georgia Teachers College. . . . In Bulloch County, teachers ask themselves—How can my teaching improve the life of my pupils? What can I do to help my pupils find solutions to the problems of life they face in this community? What are the problems that boys and girls in this community have to face? The answer to that last question is the starting point in the program of teacher education, pupil development and community improvement.

Their schools recognize seven persistent problems:

1. Maintaining mental, emotional and physical health.
2. Receiving and transmitting ideas adequately.
3. Making the best use of natural resources.
4. Performing the responsibilities of citizenship in the best way possible.
5. Expressing aesthetic and spiritual impulses in the most satisfactory manner.
6. Earning an adequate living.
7. Utilizing education.

For the purposes of this report, we shall be concerned chiefly with the organization and activities developed to accomplish objective number one—maintaining mental, emotional and physical health. It will be observed, however, that the Bulloch County program is much broader than health education alone. It concerns many other phases of community life, some of which however, contribute to health, either directly or indirectly.

The major health problem was discovered through the aid of the state health department, there being no local health department at the time. Technical specialists from the state discovered that 60% of the school population suffered from hookworm, the infestation running as high as 83% in one school and as low as 46% in another.

What to do? Each member of a teacher committee had this task confronting her: how can I help my children solve the hookworm problem in their home life and in the life of the community as a whole? It was necessary to consider both situations, because hookworm is a community as well as a personal health problem.

Representatives from the state health department met with the zone committees, supervisor and county superintendent, and discussed all angles of the hookworm problem. They also supplied literature and films which the teachers could use later in their classes.

After this preliminary training, the teacher took the problem into the classroom. The pupils studied the hookworm, —what it is, how it lives, how it is transmitted, how its spread may be checked, and how infected people may be treated.

The pupils in turn took the information acquired back into their homes, telling their parents about their findings. This was the approach to the next step, namely, plans for getting rid of hookworm in the county. These plans had two phases: first, treatment for infected children and adults; and second, preventing further soil pollution.

The first part of the plan called for cooperation between the schools, state health department, local physicians, the parents of school children and other adults. Through the county superintendent, the zone committees and other groups, a plan was worked out whereby treatments were given at schools by local physicians, with materials supplied by the state health department. This work was begun in the fall of 1936, with 60% infestation in school children. In the spring of 1940, the incidence of hookworm among school children had been reduced to 27.7%.

In the second part of the program, pupils and teachers studied the means of preventing soil pollution, and came to the conclusion that, for their purposes, the sanitary pit privy was the method most applicable. Each pupil then brought in a report of the presence or absence of such a facility at his home,—its condition, if present, and its location. In this way, a map of the sanitary conditions of the county was developed.

At this stage, the aid of the Parent-Teacher Association was sought. The schools sponsored a W.P.A. project for the construction of pit privies, and used the Parent-Teacher Associations to educate patrons in the part they should play. As the project was planned and still operates, the patrons provide the lumber; the health department provides the plans, and selects the sites; the W.P.A. provides the labor; and the county board of education provides transportation for the W.P.A. workers. From the fall of 1936 to the spring of 1940, approximately three thousand five hundred such privies have been built in Bulloch County."

The example cited above provides a clearer picture of school and community relationships in modern health education than would a lengthy academic discussion.

Many plans of community organization are described in the report of the Committee, which covered every region of the United States. The individual plans are too numerous to delineate here. The following *Specific Observations and Principles* of the study are intriguing and thought-provoking:

Modern health education is concerned primarily with learning on the part of the individual rather than with teaching by the health educator.

Community organization for health education teaches principles of democracy, and gives experience in the practical workings of democracy. Democracy, itself, is thus strengthened.

A community program of health education substitutes sound professional study and an educational approach to local needs for the less desirable, separate, discrete and sometimes overlapping health education programs based upon individual and special interests.

There is no single best plan for community organization. Local factors and available personnel will determine the type of organization.

In successful joint programs, persons and organizations have subordinated their individual desires and interests to the purpose of the joint project. Even though some individuals or groups must play more important parts than others, a dominating attitude cannot be assumed if the program is to succeed.

When the joint committee type of action is used, those agreeing to the plans made must make no mental reservations about their agreement.

If the plan for cooperation is well made, it sets up good administrative procedures and sound supervision. It defines the functions of agencies and of staff members. This facilitates joint relationships. If the mechanism of cooperation does not do these things, friction ensues which may disrupt the harmony of the program.

While the mechanism of cooperation is important, the people who operate it are even more so. A good mechanical plan can succeed only when the people who operate it are broad enough to see its value, are compatible personally, and are not antagonistic professionally.

In all the programs studied, it seems to have been the policy to make the teacher responsible for the health of the child while at school. She is recognized as the individual through whom the health education of the child is primarily secured. In many of the programs the responsibility of the teacher includes that of screening her children and selecting those pupils who are to receive health examinations by private or public physicians and dentists.

Plans of community organization for health education often move in the direction of using the services of an individual as a health education coordinator.

Continued patient and persistent effort is needed to develop community cooperation in a democratic society. Cooperation must not be expected to operate with the speed of dictatorship.

EDITOR'S NOTE: We have received, too late for inclusion in the November number, a diagram of the organization in Calhoun County, Michigan, showing the relation between schools, health departments and community groups. Since Calhoun County offers an ideal illustration of the points set forth in Dr. Turner's article, the diagram together with an explanatory statement will be printed in the December issue.

Emotional Balance—An Integral Part of Good Health

HERBERT A. ANDERSON
East Bakersfield High School, Bakersfield, Calif.

In our biology classes, we meet a large percentage of the high school students of the land. This gives us the opportunity and the responsibility to function in the health program of these adolescents at a critical period of their development. I wish to discuss that part of health education which deals with emotional bal-

ance. My remarks deal more with the teacher-student relationship than with exact methods of approach, since the methods must vary according to the background of the student group and the experience and personality of the instructor.

A few statistical statements relative to mental inbalance may properly set the challenge. More than 18,000 of our fellow Americans succeeded in suicide during the past year, and approximately another 100,000 more tried but failed in the attempt. "One out of every twenty persons goes to a mental hospital sooner or later in life," writes S. Bernard Wortis, under the title *In Search of a Normal Life*, Hygeia, April, 1941. He also states that more than half of our hospital patients are mental cases, over 500,000 of these being insane, and 150,000 others mentally defective or epileptic.

Emotional stresses begin in early childhood when the baby first becomes conscious of the realities of its existence. At this period home security and good health are of prime importance; to this must be added training in the successful meeting of emotional outbursts. The importance of development of early control is well brought out by Albert E. Wiggam in his article, *Success and Failure are Habits*, in the Ladies Home Journal, January and March, 1940.

The second critical period is ushered in by the physical and chemical changes at the time of puberty. It carries on through adolescence with heightening self-consciousness, sex puzzles and interests, and worry over Lifebuoy, Mum and Listerine propaganda. Our opportunity for real service is with this age group. Let us realize that decisions made at this time are the greatest determiners, not only of life occupations, but also of home and spiritual environments for the adult period ahead. For shaping emotional reactions the teacher-student relationship is the most important factor, more important than subject matter. To really accomplish his objective the teacher must be recognized as a friend and he must be available. Some students are alone in a crowd, others seem to exist only as fixed parts of cliques. Both types need rescue.

To gain the position of recognized leadership in the classroom group the teacher must have passed successfully through his own adolescence. He must bring with him a workable philosophy which gives emotional poise, a sense of humor, and a neighborly feeling, all of which enliven the association of good friends anywhere.

We all remember from younger days certain adults whose influence we count invaluable. They were blessed with understanding when our problems loomed big. Present adolescents have more complex environment than we knew in the more rural past. There has been a disintegration of many stabilizing influences.

Earlier family life, we remember, allowed more children of greater age range to grow up together. There was a closer occupational tie between parents and children. Daughters working with their mothers and sons working with their fathers absorbed more of the culture of their elders than happens today. Grandparents and neighbors also were a more sympathetic part of the environment than is now possible. These conservative influences tended to establish mores of social relationships, morality and ethics. Approved standards of action were known. Boys and girls today have grown up in more dispersed families, associated in play and in school chiefly with their own age groups. They have less of the vocabulary of their elders and feel ill at ease with them. They have had more influence from the radio and the

movies; have walked less and ridden further but seen less. New adolescents face new problems further complicated today by our war efforts and the world unrest. The future is less certain—decisions are harder to make.

We need wisdom to help others solve problems greater than we had to meet. The answers we knew are not always right today. However, we still find their problems are concerned with vocational choice, with getting along with the family and the neighbors, with religious questions, and much with romance and love, and last but not least, with the emerging ego. Many fortunate youths have no serious difficulties. Some, however, have strong conflicts, secret and hidden; others carry their conflicts brazenly in the open, sometimes to cover deeper secret troubles. Here some understanding adult can help the student through this period of emotional stress.

The school has gradually accepted responsibility for vocational and home economy training, has provided preparation for an enriched esthetic life through music and drama and improved recreational facilities. Health programs have come more into the science curriculum, leaving the physical education program chiefly recreational. As yet, schools have not gone far in education toward emotional adjustment. Statistics seem to indicate that for over half of our youth the absorbing interests in sex and love and family relations are not adequately handled in the home, the church or the school. Only small groups in Senior problems classes and in special college groups are reached. It seems that the schools will, of necessity, attempt to handle this branch of emotional education.

In biology, the functions of *Homo sapiens* have gradually become more important than the anatomy of the earthworm, the grasshopper, the frog and the cat. Dissection by high school sophomores has become less important than demonstration. "Professors" and "scholars" have become more informal in a fellowship of greater vitality. Self-responsibility has grown through practice in facing facts. Objective versus subjective viewpoints, rationalization and wishful thinking as applied to current problems all come in for analysis with a consequent shock to some of our complacent youth. Old beliefs and superstitions are challenged. Fads and customs are evaluated with new viewpoints. Personality problems are handled in an impersonal way and very informally when favorable opportunities arise.

In the writer's school, unfortunately, most of the students reach the tenth or eleventh year with practically no information or training in nature observation or science. The high school science courses must include much background orientation, including glimpses of astronomy and geography. As we are now considering emotional adjustment I shall briefly state the human biology sequence.

During the first semester, after studying foods, the general metabolic series follows: digestion, circulation, assimilation, respiration and excretion. Then during the second semester, after considering more general biology, we specifically take up basic anatomy, the senses, the nervous system, chemical control (endocrines), reproduction and heredity. Then disease prevention and maintenance of physical and mental-emotional health. An appropriate library of health materials is available, dealing with all sides of health including specific sex education and adolescent problems.

After the proper background and the desired rapport is established we cover the physiology of human reproduction as thoroughly as we have other bodily func-

tions, using charts and assigned readings. This is followed by a summary of mental hygiene. At this stage personality and adolescent problems have been a part of the work for months.

Because of science study there may arise in the adolescent mind a need for reinterpretation of many ideas gained in earlier religious training. Recognizing the values of all stabilizing social forces, such as religion, it would seem necessary to encourage growth in this phase, making for broader understanding. We should avoid shocks which sometimes may lead to entirely giving up the religious influence or rebelling against the apparently conflicting points in science. As one grows in knowledge he must grow in recognition of orderly existence. Science must continue to influence intelligent interpretation.

Some teachers do not feel secure in handling the problems just mentioned. Until they do they should not embarrass themselves. If problems are too controversial they may be negative in effect. It may be necessary to do considerable preparation through the study of adolescent psychology and to use help from such investigations as have been recently reported in the field.

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A SIMPLE WATER AERATOR

In conducting water culture experiments, one frequently desires forced aeration of the water. A rubber tube alone emits such large air bubbles that its value is probably chiefly psychological.

Aeration devices can be obtained from most biological supply houses, but an efficient aerator can be made quickly at a very nominal cost.

Obtain a charcoal block, the type used in chemistry laboratories for blowpipe tests, and cut it in half. Into the longitudinal face of one piece, bore a hole about the diameter of a glass tube, three-fourths of an inch deep. Fit a short piece of glass tubing into this hole and seal it to the block with sealing wax, paraffin, or De Khotinsky cement.

This carbon aerator is particularly useful in fresh water and marine aquaria and for root aeration in hydroponic cultures.

The writer wishes to acknowledge the cooperation of Lester Brubaker, who collaborated in developing the device.

M. F. Vessel,
San Jose State College,
San Jose, California

RULES FOR MENTAL HEALTH

1. Have a Hobby: Acquire pursuits which absorb your interests. Sports and "nature" are the best. (Don't let it become a passion, as then it is no longer a true hobby.)
2. Develop a Philosophy: Adapt yourself to spiritual surroundings.
3. Share Your Thoughts: Cultivate companionship in thought and feeling. Confide, confess, consult.
4. Face Your Fears: Analyze them; daylight dismisses ghosts.
5. Balance Fantasy with Fact: Dream, but also do; wish, but build; imagine, but ever face reality.
6. Beware Alluring Escapes: Alcohol, opiates and barbitals may prove faithful friends.
7. Exercise: Walk, swim, golf; muscles need activity.
8. Love But Love Wisely: Sex is a flame which, uncontrolled, may scorch; properly guided, it will light the torch of eternity.
9. Don't Become Engulfed in a Whirlpool of Worries: Call early for help. The doctor is ready for your rescue.
10. Trust in Time: Be patient and hopeful; time is a great therapist.

Andrew C. Ivy, Ph.D., M.D.,
Northwestern University

(These "Rules for Mental Health" received the first prize in a contest among the members of the Cleveland Academy of Medicine.)

BIOLOGY CLASSES MAKE CHRISTMAS FOR THE BIRDS

The article, "Decorating a Christmas Tree with Plants and Animal Specimens," in the November 1941 issue of The American Biology Teacher, gave me a world of new ideas for our annual Christmas tree for the birds. For several years our biology classes have each decorated and filled a tree to capacity with appropriate gifts for our winter friends. We use only natural and edible trimmings.

We begin our study with this Christmas-spirit project. A list of winter birds in our locale is compiled by the pupils. Then the names are put on separate slips and drawn from a hat. Each pupil makes a careful study of the bird whose name he drew—its habitat, characteristics, relatives, habits, and particularly its food preferences. Pictures of the birds are posted and oral reports are given. Each pupil tells the interesting things he has learned about his bird. Following the reports, and a few days before Christmas, gift suggestions are

discussed. Some pupil in each class volunteers to bring the Christmas tree, a spruce or balsam fir. Then follow busy days of preparing the gifts. The day before Christmas vacation arrives, the gifts appropriate for the birds are ready. Many pupils tie to the gifts a tag with an original greeting to his special bird. Tags are sometimes printed on painted oak leaves or burned into birch bark.

Now comes the fun of trimming the trees! "Sure hope the old bird tastes of mine." "Oh, look at Myra's suet ball!" "Put the big doughnut right over the top sprout of the tree." "What did you bring, Paul?" "For the juncos?" Characteristic gifts are: strings of cranberries, apricots, popcorn and corn kernels (the blue jays vie for these); all types of evergreen cones stuffed with suet; tin tops from mayonnaise jars and the like, brightly painted and filled with meat fat and seeds—all gifts must be fastened well against the wintry winds; pieces of bread soaked in meat fat and stuck full of seeds or spread with peanut butter; doughnuts tied in red and green (how the chickadees love them!); baskets of grains—one male and four female pheasants visited one of the trees last year to claim their rightful share of these. Interest runs at a high pitch and pupils bubble over with merriment. We know from experience how much our efforts will be appreciated and feel well rewarded for our labors.

Our trees are placed where some elderly or invalid person may enjoy watching the birds or where they may be seen from the classroom.

The following birds are among the visitors we have observed: juncos, tree sparrows, english sparrows, song sparrows, red polls, nuthatches, downy woodpeckers, hairy woodpeckers, pheasants, chickadees, blue jays, starlings.

Helen Drugg,
Keene High School,
Keene, New Hampshire

Books

Downing, R. Elliot, and McAtee, M. Veva. *Living Things And You.* Lyons & Carnahan, Chicago. 673 pp. 1940.

Mechanical Make-up: This text represents one of the leaders in the recent laudable trend of artistic typographical layout. The line cuts of this book are superb dynamic black-and-whites with a most pleasing sharpness and accuracy. The didactic material supplementing each illustration does justice to the near perfection of the frequently dramatic pictorial material. The printing is well done, a heavy bold type very well spaced and easily read. However, it is felt the paper may not be sturdy enough to withstand long pupil usage. The cover is of a green and white attractively laid out design. There is a striking colored frontispiece. The text is the standard $5\frac{1}{2} \times 8\frac{1}{2}$ inches.

Literary Style: Picturesque terms, unusual paragraph headings, and fine descriptions tend to make parts of the book so interest-provoking that it becomes a story instead of a text. The authors catch the attention of the student with such statements as: parasites are "thieves," and some seeds are "hitchhikers," microorganisms are "wrecking crews," and the water supply is a "dictator." Subject matter is related directly to the student by such paragraph headings as: "How do forest fires affect the price of your books?" "The price of beef can be influenced by the number of cats."

Yet the profusion of technical terms and the tendency of the authors to include material above the level of 10th grade students make other parts of the book uninteresting and difficult to understand. The technical terms used seem out of line with the present trend toward a simpler vocabulary. Such words as parenchyma, megastrobili, prosencephalon, and heterozygous might well be left for more advanced courses. While some students might be interested in the scientific names for organisms the majority will wish that such terms as Coleochaete, Metridium,

or Gonionemus did not hinder the continuity of the reading. To the poor reader such an array is disheartening.

Teachers and students interested in such a vocabulary will appreciate the italicized words, the pronunciation and description which are a part of the text, and the immediate use of the new word in the following reading matter.

This 673-page book contains fifty-seven problems grouped into fourteen units: Living Things; Being Alive; Plant Factories; Plant Kingdom; Animal Kingdom; Friends and Foes; Societies; Digging Up the Past; Early Man; Embryology; Heredity; Behavior; Conservation; Biology and You.

The foreword states the book's purpose; to socialize biology and present such principles as will make a pupil a better citizen by teaching him the rules of the game of life. A scholarly attempt is made to do this, particularly in Unit One, which includes valuable material rarely found in high school texts. Lower plants and animals, anthropology, and reproduction are fully treated; insects, mollusks, cell theory, somatogenesis, diseases and flowering plants are treated briefly; ductless glands are defined but otherwise not mentioned.

Much of the material is interesting, worthwhile, practical, and will connect with pupils' experiences; fundamental generalizations and, except for ductless glands, essential topics are presented. Those places where the book goes into technical detail may not interest the pupil unless he is above average and has a skillful teacher.

Some subject-matter criticisms, some typographical, are: page 48—no mention of curious inability of desert arthropods and reptiles to stand much heat; page 102—secretions of pancreas and liver named in reverse order; fatty acids omitted as third product of fat digestion; page 121—modern toxoid diphtheria treatment not mentioned; page 448 lists 13 million, page 528, 13 billion, cells in the cerebrum.

Learning Exercises and Teacher's Helps: This text ranks high in the number and quality of both learning exercises and teacher's helps. There are numerous, well-selected demonstrations, self-testing exercises, suggestions for summaries and outlines, a pupil's workbook, and other helpful devices.

While there are no review summaries, which might lead to rote memory, the earlier chapters have complete summaries, in outline form, using questions instead of statements, so the pupils answering the questions would have a logical and detailed outline of a chapter. From these early chapters the students are supposed to learn how to outline the remaining ones.

Each chapter has a series of practical problems based on the facts and principles of the unit, and developing either the practical application of the chapter, of a different aspect of the unit. They all require the student to apply his knowledge to new situations.

Of interest also are the sections on scientific thinking following each chapter, and the very complete table of contents, index, and pronouncing glossary. The appendix lists, among other things, visual aids that will be useful to the teacher.

There is a pupil's workbook, originally meant to accompany any biology textbook, containing more text-material, with more emphasis on scientific method, and more attention to biological principles, than is customary in such manuals. It is well-illustrated with line drawings. A teacher's key to the manual and a separate series of unit tests are available.

Psychological Soundness: This book lives up to its name, being a type of general biology written with much human interest. It is the unit type, with fairly uniform units divided into interesting and timely problems which in turn are developed by the scientific method. The last unit, Biology and You, is a study of vocational and avocational possibilities in biology.

The organization is such as to stimulate interest in the living things found about us. The sequence is such that one can follow the seasons or change the order of a few units to adapt them to individual needs. There is definite evidence of increasing difficulty as one goes from one unit to the next, and as a whole, it may be slightly difficult for some ninth grade classes. However, there are enough individual problems and projects to provide for individual differences. All of the problems are developed through inductive methods with many opportunities for the student to use the scientific method, both in the text and in the accompanying workbook.

A summary review comprising key questions follows most units; also a self-test, suggested readings and activities, and scientific thinking. Many of these are excellent. There are appendices on visual aid, foods, classification, and a 611-word glossary, but no key to pronunciation.

ALAN A. NATHANS (Chairman)
ALVA Z. ALLEN, New Hampshire
IRENE HOLLENBECK, Oregon
MARION RICHTER, New York
L. J. GIER, Missouri

CRANDALL, JR., LATHAN A. *An Introduction to Human Physiology.* 3rd ed. W. B. Saunders Company, Philadelphia. xii + 388 pp. Illus. 1942. $2.25.

The growing realization of the importance

of a knowledge of our body functions has led to greater emphasis on physiology and hygiene in our biology courses. For the teacher who desires a ready reference giving the principles of physiology along with their practical applications this third edition of Crandall's will prove a convenient handbook. The previous editions set forth the salient features of each body function in their simplest terms. This edition, revised and rewritten in the same interesting style, brings this knowledge up to date, especially in the fields of respiration, nutrition, sensation and circulation. The illustrations are adequate and well chosen. A glossary is included.

BROTHER H. CHARLES, F.S.C.,
St. Mary's College,
Winona, Minnesota

GUBERLET, MURIEL LEWIN. *The Seashore Parade.* The Jaques Cattell Press, Lancaster, Pennsylvania. 197 pp. Illus. 1942. $1.75.

Muriel Lewin Guberlet, knowing the seashore and its tenants, describes for the reader of "The Seashore Parade" the immense ecological drama enacted frequently through necessity by the common organisms of this area. This book has an array of facts which emphasize structural adaptations to both biological and physical aspects of this environment. Likewise, factors such as food habits and protective adaptations are discussed in connection with organisms described.

The book has a value, which should not be overlooked when junior high school science and biology teachers are selecting supplementary reference books; for example, this information may become the foundation upon which more detailed scientific information can be taught to students. Jan Ogden's illustrations, both colored and pen sketches, have a significant relationship to the animals described in the book.

LEE R. YOTHERS,
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Rahway, New Jersey

DOBZHANSKY, TH. (Editor). *Biological Symposia.* Vol. VI. The Jaques Cattell Press, Lancaster, Pa. xii + 355 pp. 1942. $3.50.

A noteworthy characteristic of today's growth of biology is the progressive synthesis of results of investigations in the specialized fields. This movement is evidenced by the frequent presentation of symposia on broad general problems. Making up the present volume are three symposia on three such problems: *Temperature and Evolution* (9 papers), *Isolating Mechanisms* (4 papers), and *Genetic Control of Embryonic Development* (3 papers).

A majority of the fourteen contributors (H. H. Plough, G. Fankhauser, George P. Child, Emil Witschi, H. J. Muller, Walter Landauer, Alfred C. Kinsey, John A. Moore, G. Ledyard Stebbins, Jr., Albert P. Blair, J. T. Patterson, V. C. Twitty, V. Hamburger, Sewall Wright) are prolific workers and respected authorities in their special fields. The articles are largely summaries of researches extending in some cases over a period of many years. Much light is thrown on the process of evolution through analysis of recently discovered facts in taxonomy, ecology, cytology, genetics, and experimental embryology. Isolation in its various forms—a factor in species formation receiving much attention from modern students—is given a penetrating discussion in connection with studies on plants, gall wasps, drosophilas, and anurans. The papers on the genetic control of embryonic development illustrate in amphibia, the chick, and the guinea pig the progress made toward a synthesis of genetics and embryology.

Many of the articles are illustrated with excellent drawings and photographs; each has its own literature list. There is no index. The typography is excellent and the binding substantial. This book is heartily recommended as an addition to the biology library and for a place on the shelf of the serious student of living things.

EDWARD C. COLIN,
Chicago Teachers College

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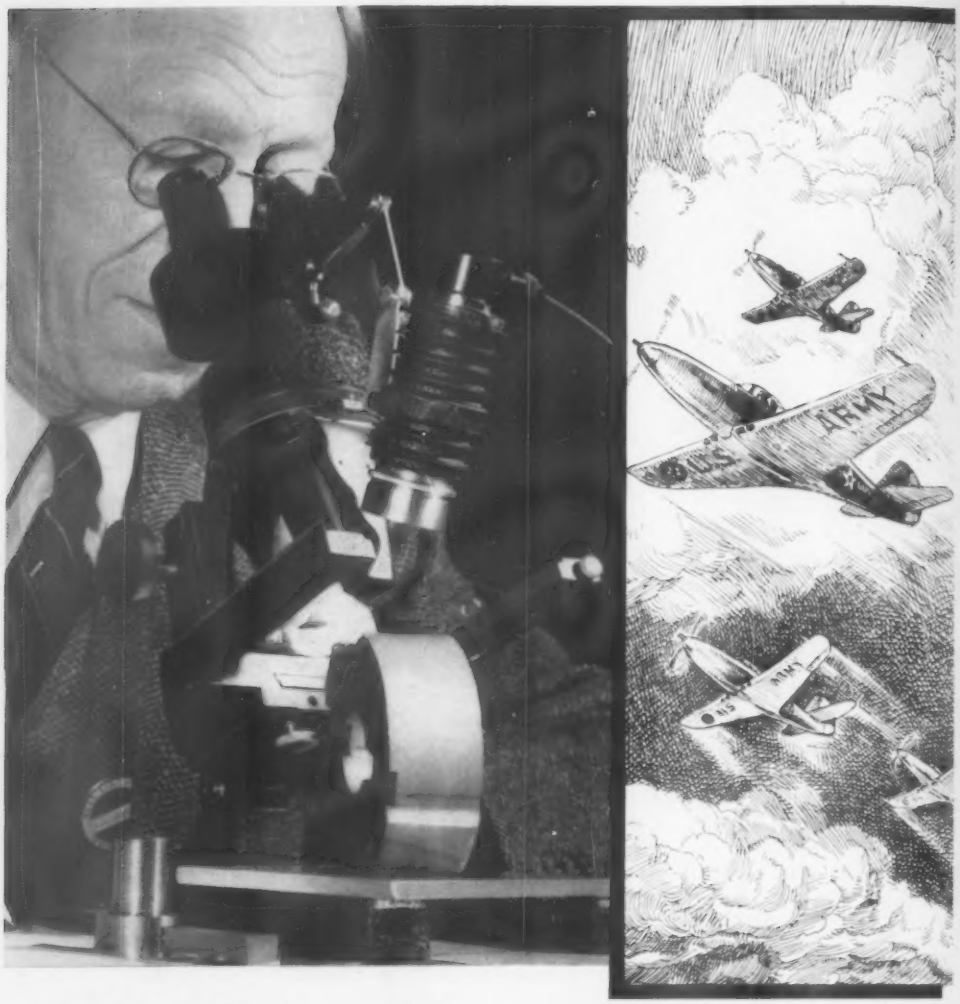

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